

Application 10/733,534

Attorney Docket P006.210

May 20, 2007 Reply to Restriction Requirement dated March 21, 2008

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in this application:

Listing of Claims:

1-13. cancelled

14. (currently amended) A method for extracting a multi-protein complex comprising the steps of:

a. introducing a sample solution comprising the multi-protein complex into an extraction channel, said multi-protein complex comprising at least a first protein and a second protein, said extraction channel having an inner surface comprising an extraction surface that binds said multi-protein complex, whereby said multi-protein complex is adsorbed to said extraction surface;

b. optionally passing a wash solution through the channel; and

c. passing a first desorption solution through the channel, thereby eluting said first protein.

15. (currently amended) The method of claim 14, wherein prior to step (c), the channel is purged with a gas between steps (a) and (b), so that said extraction channel is substantially free of bulk liquid.

16. (original) The method of claim 15, wherein said extraction surface remains substantially solvated after the purging step.

17. (currently amended) The method of claim 14, wherein the multi-protein complex is selected from a group consisting of:

a multi-protein complex comprising a His-tagged protein, a multi-protein complex comprising a phosphopeptide or a phosphoprotein, a multi-protein complex comprising a small molecule-tagged protein, a multi-protein complex comprising a protein antigen, a multi-protein complex comprising an epitope-tagged protein, a multi-protein complex comprising a kinase, a multi-protein complex comprising a phosphatase, a multi-protein complex comprising a glycopeptide or a glycoprotein, a multi-protein complex comprising a biotinylated protein and a multi-protein complex comprising a biotinylated nucleic acid bound to a protein.

~~wherein a wash solution is passed through the channel between steps (a) and (b).~~

18. (original) The method of claim 14, wherein said second protein remains adsorbed to said

Application 10/733,534

Attorney Docket P006.210

May 20, 2007 Reply to Restriction Requirement dated March 21, 2008

extraction surface.

19. (original) The method of claim 14, wherein the entire multi-protein complex is eluted.
20. (currently amended) The method of claim 18, wherein after step (c)(b) a second desorption solution is passed through the extraction channel, thereby eluting said second protein.
21. (original) The method of claim 20, wherein said protein complex further comprises a third protein, and wherein after elution of said second protein a third desorption solution is passed through the extraction channel, thereby eluting said third protein.
22. (previously presented) The method of claim 19, wherein the first desorption solution does dissociate the multi-protein complex.
23. (original) The method of claim 20, wherein the first and second desorption solutions differ in at least one of the following parameters: pH, ionic composition, ionic strength, and solvent polarity.
24. (original) The method of claim 20, wherein at least one of the desorption solutions contains an agent that effects protein-protein interactions.
25. (original) The method of claim 24, wherein the agent is selected from urea, guanidinium chloride and isothiocyanate.
26. (original) The method of claim 14, wherein the multi-protein complex comprises a recombinant bait protein.
27. (original) The method of claim 26, wherein said recombinant bait protein comprises a fusion tag.
28. (currently amended) The method of claim 14, wherein a step elution is performed.
29. (withdrawn) A method for extracting a multi-protein complex comprising the steps of:
 - a. introducing a sample solution comprising a first protein into an extraction channel, said extraction channel comprising an extraction surface that binds said first protein, whereby said first protein is adsorbed to said extraction surface;
 - b. passing a second protein through said extraction channel, whereby said second protein binds to said first protein to form a multi-protein complex;
 - c. passing a desorption solution through the channel, thereby eluting said second protein.
30. (withdrawn) The method of claim 29, wherein said first protein is additionally eluted in step (c).
31. (withdrawn) The method of claim 30, wherein said first and second proteins are eluted as a

Application 10/733,534

Attorney Docket P006.210

May 20, 2007 Reply to Restriction Requirement dated March 21, 2008

multi-protein complex.

32. (withdrawn) The method of claim 29, wherein said first protein comprises a fusion tag.
33. (withdrawn) The method of claim 32, wherein said fusion tag is a poly-histidine tag.
34. (withdrawn) The method of claim 29, wherein said eluted second protein is non-denatured.
- 35-37. cancelled
38. (withdrawn) The method of claim 29, wherein the channel is purged with a gas between steps (a) and (b), so that said extraction channel is substantially free of bulk liquid.
39. (withdrawn) The method of claim 38, wherein said extraction surface remains substantially solvated after the purging step.
40. (withdrawn) The method of claim 29, wherein a wash solution is passed through the channel between steps (a) and (b).
41. (new) The method of claim 14 wherein the sample solution, the wash solution or the first desorption solution are flowed back and forth through the extraction channel.
42. (new) The method of claim 20 wherein the second desorption solution is flowed back and forth through the extraction channel.
43. (new) The method of claim 19 wherein the entire multi-protein complex is eluted with a solid phase extraction tube enrichment factor greater than 1.
44. (new) The method of claim 43 wherein the entire multi-protein complex is eluted with a solid phase extraction tube enrichment factor greater than 2.
45. (new) The method of claim 14, wherein the extraction channel is a capillary.
46. (new) The method of claim 45, wherein the capillary is comprised of fused silica.
47. (new) The method of claim 45, wherein at least one portion of the capillary is non-linear.
48. (new) The method of claim 47, wherein at least some portion of the capillary is coiled.
49. (new) The method of claim 14, wherein the extraction surface is 3-dimensional.
50. (new) The method of claim 49, wherein the extraction surface is comprised of an affinity binding agent selected from the group consisting of a chelated metal, a protein, an organic molecule or group, a sugar, and a nucleic acid.
51. (new) The method of claim 14, wherein the extraction surface is comprised of an affinity binding agent selected from the group consisting of a chelated metal, a protein, an organic molecule or group, a sugar, and a nucleic acid.
52. (new) The method of claim 14, wherein the method is performed in a plurality of channels operated in parallel.

Application 10/733,534

Attorney Docket P006.210

May 20, 2007 Reply to Restriction Requirement dated March 21, 2008

53. (new) The method of claim 14, wherein the method is carried out in a solid block having one or more passageways running therethrough.